

Safety Evaluation by the DOE Regulatory Unit
of Proposed Authorization Basis Amendment Request,
ABAR-W375-00-00018, Rev. 0
to the Integrated Safety Management Plan for
the River Protection Project-Waste Treatment Plant Project
(Contract DE-AC27-96RV13308)

1. INTRODUCTION

The River Protection Project-Waste Treatment Plant (RPP-WTP) project is intended to design, construct, operate, and deactivate a facility to vitrify radioactive tank waste at the Hanford Site. The Integrated Safety Management Plan (ISMP) is the Authorization Basis (AB) document that provides the contractor's integrated safety management approach that will be used to design, construct, and operate the vitrification facility. By the BNFL Inc. (BNFL) letter from A. J. Dobson to D. C. Gibbs, RU, "Contract No. DE-AC06-96RL13308-W375-Transmittal of Authorization Basis Amendment Requests," CCN012921/00-RU-0343, dated April 24, 2000, the contractor, BNFL, submitted a proposed amendment to revise "building and operating a full scale melter" to "operating a pilot melter" in ISMP Section 3.7, "Proven Engineering Practices," and revise "Process vessel vents are treated to scrub out radioactive particulates before passing through filter media." to "Melter off-gas streams are treated to scrub..." in ISMP Section 3.9.2 (As Low As Reasonably Achievable [ALARA] Design).

The amendment was requested as a result of the contractor's continuing design development of the RPP-WTP. Based on its most current design information, the contractor considers that the revised ISMP will allow it to design the facility more efficiently and economically without adversely affecting the safety to workers, co-located workers, and the public.

2. BACKGROUND

The ISMP documents the process by which laws, regulations, and standards applicable to the nuclear, radiological, and process safety aspects of the RPP-WTP are incorporated into programs for facility design, construction, operation, and deactivation to ensure adequate safety of workers and the public and protection of the environment. The proposed changes (described in the Introduction above) are ISMP examples of process and design details that define the methods used by the project to conform to the top-level safety standards and principles established in DOE/RL-96-0006, *Top-Level Radiological Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*. These process and design changes have resulted in BNFL's request to change the ISMP.

3. EVALUATION

The amendment proposes to revise "building and operating a full scale melter" to "operating a pilot melter" in ISMP Section 3.7. The original intent of ISMP Section 3.7 is to require the RPP-WTP facility design to incorporate the use of proven technologies so that lessons learned from

the use of the proven technology are incorporated into the operation of the facility. Absent the ability to use proven technologies to accomplish the facility objectives, the ISMP notes that new and novel technologies may be used but should be examined through a program of research and development. Such research and development work includes building and testing melter designs. BNFL considers that an upgrade of an existing pilot Low Activity Waste (LAW) melter in lieu of a full scale pilot melter, as previously proposed, will provide a sufficient test bed to examine or prove novel processes, test the design and maintainability of the components, and provide operator training in operations and maintenance of the production LAW melter. The proposed test melter will allow the use of full-scale containers, large scale feed tank systems, large scale off-gas system, and full-scale melter components. The pilot LAW melter is about a third section of the production melter. However, many features are full scale. Important full-scale features include the following:

- Electrode spacing
- Height/depth of the melter
- Thickness of the refractory walls.

Safety concerns identified by the contractor in the operation of a production LAW melter, such as foaming in the melter, melter off-gas release, melter glass pour errors, and glass spill can be investigated by operating the existing LAW pilot melter. The other significant safety issue identified by the contractor is melter gas flow or the pressure control in the melter. Although the pilot melter can not simulate the flow conditions of three production LAW melters operating simultaneously, dynamic simulation modeling for gas flow in the off-gas system can be performed independently to underpin the melter pressure control design for normal and off-normal operating conditions.

The contractor stated that the pilot High Level Waste (HLW) melter is about two-thirds the height of the production melter. This pilot melter will allow filling of a full-scale container and will include a large-scale off-gas treatment system. Operational concerns associated with the production HLW melter such as off-gas release, glass spill, melter glass pour system errors, and direct radiation exposure can be investigated by the operation of a pilot HLW melter.

The proposed change incorporates the contractor's ongoing melter testing program into the ISMP examples of how proven engineering practices (SRD Safety Criterion 3.7.1) will be used. Although the technical adequacy of this testing program will continue to be examined, the RU finds that this change in the methods of research and development of new and novel technologies is acceptable.

The amendment also proposes to revise "Process vessel vents are treated to scrub out radioactive particulates before passing through filter media." to "Melter off-gas streams are treated to scrub..." in ISMP Section 3.9.2, "ALARA Design." The original intent of ISMP Section 3.9.2 was to ensure that procedures are established to implement an ALARA program. Inclusion of original wording "Process vessel vents are treated to scrub out radioactive particulates before passing through filter media." in ISMP Section 3.9.2 was intended to serve as an example to illustrate the contractor's implementation of the ALARA program, not as a design requirement. The contractor stated that its original process vent system design was very preliminary. As the design evolved, it was determined that the majority of process vessel vents do not contain significant radioactive material and that scrubbing in advance of the filters is not needed for all

ventilation systems. The use of scrubbers in advance of filters was a poor choice to illustrate the ALARA program and the contractor proposes to remove this example from the ISMP.

Although the technical adequacy of the contractor's process vent system without scrubber units will be examined in the construction authorization submittal, the RU finds that a change in this ISMP example of the ALARA implementation process is acceptable.

4. CONCLUSION

On the basis of the considerations described above, the RU has concluded that there is reasonable assurance that the health and safety of the public, the workers, and the environment will not be adversely affected by this proposed amendment. The proposed amendment complies with applicable laws, regulations, and requirements, conforms with U.S. Department of Energy-stipulated top-level safety standards and principles, and provides adequate safety. Accordingly, this review concludes that the proposed amendment to the authorization basis is acceptable.